

Humb. & Bonpl., Pl. aequinoct. 2: 75, pl. 102. 1809.

REFERENCE—T. B. Croat, Flora of Barro Colorado Island, p. 790. Stanford Univ. Press. 1978.

**Shrubs** or small trees to 10 (17) m tall; **internodes** between leaf-bearing nodes 4–6 mm thick, tetragonal, brown tomentose. **Leaves** with petioles 1.5–6 cm long; laminae ovate to elliptic, 10–26 cm long, 6–10 cm broad, apically acuminate to acute, basally acute to obtuse or oblique, margins entire to slightly undulate, the surfaces glabrous except sparingly pilose on the costa of larger leaves. **Inflorescences** in terminal, compact panicles tending to be secund, to 15 cm long, 6 cm broad, branches light brown tomentose. **Flowers** subtended by 2 triangular bracteoles to 3 mm long; sepals 10–12 mm long, tomentose, apically rounded to acute; **corolla** shiny yellow in the throat, brownish red in the expanded portion, 3–4 cm long, glabrous at throat, silky tomentose above, silky tomentose outside, the tube 1–1.5 cm long, the limb 2–3 cm across; lobes 4–6 mm broad, oblong to oblong-ovate; ovary brown tomentose, style 4–5 cm long. **Fruits** 1.5–2 cm long, 5 mm broad, apically obtuse, sericeous; seeds flattened, lenticular, 3–4 mm in diameter.

This is a wide-ranging species of moist lowland forests, frequently along streams and swampy areas. While it is not abundant in areas where collected, it extends from Costa Rica through Colombia and Venezuela to the mouth of the Amazon in Brazil. Although *T. gigantea* occurs in Costa Rica (Leonard, 1938), this description is based upon Panamanian collections. On Barro Colorado Island, Panama, Croat has observed flowering from January to April, especially in February and March.

*Trichanthera gigantea* is recognized by its arborescent habit; paniculate inflorescences with tomentose sepals and corolla; more or less equally five-lobed corollas 3 to 4 cm long; didynamous stamens with two-celled anthers that are basally rounded; sericeous capsules with one to four seeds. It may be confused with *Bravaisia integerrima*, which differs in its basally spurred anthers and glabrous capsules that are eight-seeded.

## PLANTAGINACEAE

By William Burger

**Herbs** (rarely subshrubs with few-branched woody stems in island endemic species of *Plantago*), annual or perennial, stems usually very short above the ground with closely congested internodes, xylem in discrete bundles or forming a cylinder, a rhizome often present; stip-

ules absent. **Leaves** alternate (rarely opposite), simple and usually from basal rosettes, petioles often not strongly differentiated from the lamina, leaf-base clasping the stem; laminae linear to broadly ovate, entire or with small lobes or teeth, glabrous or puberulent, venation palmate or parallel. **Inflorescences** solitary from each leaf axil, **flowers** usually in dense spikes or capitula on a long, unbranched peduncle, each flower subtended by a single bract. Flowers small and sessile or subsessile, bisexual (in ours) or unisexual, radially symmetrical and usually 4-parted (rarely 3-parted); sepals 4 (3), free or partly united, imbricate in bud; petals united to form a short tube, the 4 (3) corolla-lobes spreading or reflexed at anthesis, membranous to scarious, white to yellowish, often persisting; stamens as many as the corolla-lobes and alternate with them (1 or 2 in *Bougueria*), filaments borne on the corolla-tube and inflexed in bud, anthers exerted and versatile, 2-thecous, introrse and longitudinally dehiscent, pollen 4–20-porate; pistil 1, ovary superior, usually 2–(3, 4)-locular in *Plantago* with 1 to many ovules in each locule, 1-locular with a single basal ovule in *Bougueria* and *Littorella*, style 1, stigma 1- or 2-lobed. **Fruit** a thin-walled capsule opening at or below the middle circumscissily (a pyxis) in *Plantago*, a small nut in *Bougueria* and *Littorella*; seeds often lustrous, endosperm present (absent in *Littorella*), embryo straight (curved in *Bougueria*).

A family of three genera and about 250 species in temperate, arctic, and montane habitats. *Bougueria nubicola* is found in the high Andes of southern South America. *Littorella* is a genus of semiaquatic, freshwater habitats, with one species in Europe, one in North America, and a third species in southern South America. *Plantago* is cosmopolitan in cooler or montane habitats and the only genus found in Central America. While its close relationships are obscure, the tubular corolla and bilocular ovary with axile placentation (in *Plantago*) has suggested an affinity with the Scrophulariales.

### *Plantago* Linnaeus

**Herbs** (in ours) or **subshrubs**, annual or perennials, usually scapose plants with very short stems, clustered basal leaves and erect, unbranched peduncles bearing small, congested flowers. **Leaves** all basal and rosulate in Central American species, alternate and tightly congested (in ours), petioles present or absent, poorly differentiated from the lamina, clasping the stem at their base; laminae linear to broadly ovate, glabrous or more often puberulent, entire or with short blunt lobes or teeth, venation palmate or parallel. **Inflorescences** spicate or capitate with long, erect, unbranched peduncles, flowers sessile in the axils of bracts. **Flowers** small and bisexual, sessile in the axils of bracts, sepals 4, free or partly united, often unequal with 2 longer and 2 shorter, imbricate in bud, margins scarious, petals united to form a short tube,

the 4 lobes reflexed or spreading at anthesis, persistent and sometimes forming a cover over the fruit; **stamens** 4 or 2, exerted at anthesis; ovary 2-locular or 3- or 4-locular by intrusion of the placenta, ovules 1 to several in each locule. **Fruit** a thin-walled capsule with circumscissile dehiscence around the middle; endosperm present, embryo straight.

A genus of worldwide range but restricted to temperate, arctic, and montane environments; absent in the lowland tropics except on islands. A number of island endemics have unusual woody growth forms, but most species have a very short aerial stem, leaves arising from near the ground

and erect scapose inflorescences. These plants can be mistaken for sedges and other monocotyledons because of the often narrow leaves with parallel venation and the small, tightly clustered flowers subtended by brownish bracts. The small flowers with short corolla-tube, four scarious corolla-lobes, long, slender filaments, exerted versatile stamens, and fruit with circumscissile dehiscence easily distinguish these plants. Dr. Knud Rahn has revised many New World species (see *Nordic Journal of Botany* 3: 331-342, 1983, and included references).

### Key to Species of *Plantago*

- 1a. Leaves becoming broadly ovate, lamina abruptly narrowed at the base (in larger leaves); corolla-lobes 0.5-1 mm long; ovary with many ovules, seeds usually more than 8 . . . . . *P. major*
- 1b. Leaves elliptic to oblanceolate, laminae tapering gradually at the base to join the poorly differentiated petiole; corolla-lobes 2-3 mm long; ovary with 6 or fewer ovules, seeds fewer than 7 . . . . . 2a
- 2a. Corolla-lobes persisting and erect in fruit, forming a pointed "cap" at the apex of the fruit; ovary with 3-6 ovules, seeds 1-6; native and common . . . . . *P. australis*
- 2b. Corolla-lobes not persisting as a cap above the fruit; ovary with 2 ovules; seeds 1 or 2; introduced, rare . . . . . *P. lanceolata*

**Plantago australis** Lamarck, *Encycl. Meth. Bot. Illust. Gen.* 1: 339. 1793. *P. hirtella* H.B.K., *Nov. gen. sp.* 2: 187 or 229, t. 127. 1817. *P. hartwegii* Decne. in DC., *Prodr.* 13, pt. 1: 724. 1852. *P. schiedeana* Decne. in DC., loc. cit. 723. *P. sodiroana* Pilger, *Bot. Jahrb. Syst.* 25: 733. 1898. *P. ecuadorensis* Pilger, loc. cit. 50: 232. 1913. *P. australis* ssp. *hirtella* (H.B.K.) Rahn, *Bot. Tidsskr.* 60: 50. 1964. Figure 19.

**Herbs**, perennial, stems very short above the ground, **internodes** congested and obscured by the leaf-bases. **Leaves** usually in basal rosettes, quite variable in size on different plants, petioles to 15 cm long; laminae 4-25 (35) cm long 0.5-5 (7) cm broad, lanceolate to oblanceolate or narrowly elliptic-obovate, obtuse to acute at the apex, gradually narrowed to the base and continuous with the petiole, margin entire or slightly undulate, very sparsely (rarely glabrous) to densely puberulent on both surfaces with slender septate and translucent hairs 0.5-1.5 mm long, drying thin-chartaceous and greenish, venation parallel with (3) 5 or 7 primary veins. **Inflorescences** 3-50 (100) cm long, peduncle sparsely to densely whitish villous with hairs to 2 mm long, flowering portion 3-50 cm long, flowers usually congested near the apex, more separate near the base, **bracts** 1.6-4.2 mm long, 0.6-1.4 mm wide, triangular to ovate, usually ciliate along the margin. **Flowers** with sepals 1.7-2.7 mm long, ca. 1 mm broad, 1 often longer than the other 3, usually puberulent along the keel and ciliate along the margin distally, corolla-lobes 2-3.5 mm long, narrowly ovate, usually erect and spread apart only at anthesis,

persistent and becoming stiff in fruit; anthers 1.2-1.6 mm long; ovary usually with 3 ovules. **Fruit** 2-4 mm long, to 6 mm together with the persisting beaklike imbricate corolla-lobes, pale brown; seeds 1.2-2.4 mm long, ca. 1 mm broad, oblong, flat and with a small circular scar on the inner face, pale brown, smooth.

Plants of open, sunny sites in regions of wet, evergreen, montane forest formations between 1500 and 3200 m elevation in Costa Rica; to as low as 400 m in northern Central America. Inflorescences are produced throughout the year, but there may be a flowering peak in August. The species ranges from Arizona and Mexico through the Central Highlands of Central America and western Panama through the highlands of northern and central South America to Bolivia, Brazil, and Argentina.

*Plantago australis* is our only native species of *Plantago* and can be recognized by the stiff, erect corolla-lobes that are persistent and form a "beak" on the apex of the fruit. The corolla-lobes appear to be open for a very short period during anthesis and are otherwise erect and imbricate. As with other species, the name *Llantén* is commonly used for these plants. Rahn distinguishes a number of subspecies; most of our material would appear to belong to ssp. *hirtella* (H.B.K.) Rahn.

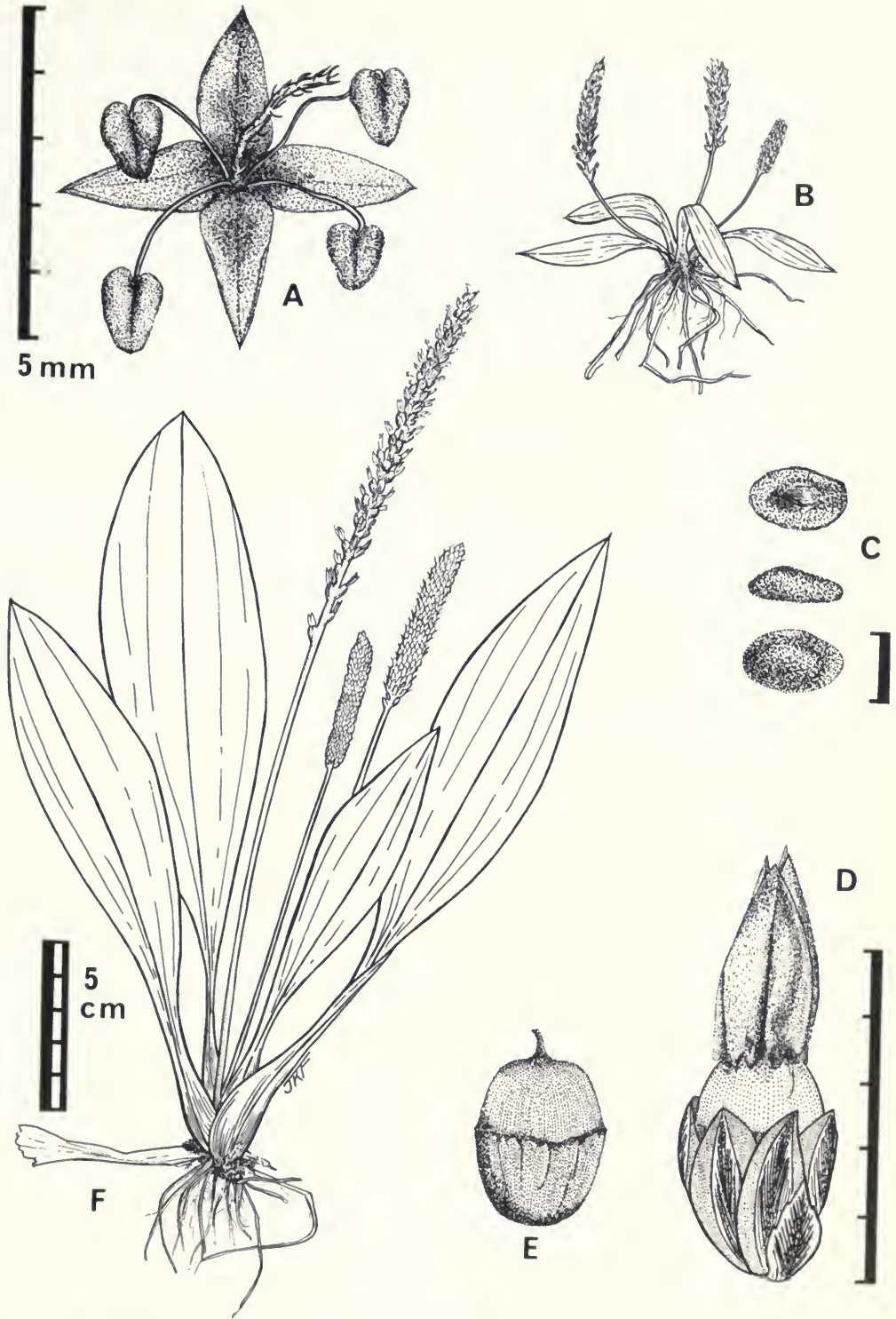


FIG. 19. Plantaginaceae: *Plantago australis*. A, Flower viewed from above; B, a small plant; C, seeds (1-mm scale); D, fruit with bracts and perianth (5-mm scale); E, fruit (same scale as D); F, a large plant.

***Plantago lanceolata* L., Sp. pl. 113. 1753.**

**Herbs**, annual or becoming perennial, aerial stem very short with congested internodes, secondary roots numerous. **Leaves** erect or spreading laterally, petiole weakly differentiated from the lamina, clasping the stem at the base; lamina 4–28 cm long, 0.5–4 cm broad, lanceolate to oblong-lanceolate, entire or with small teeth along the margin, glabrous or puberulent, the veins usually strongly impressed above. **Inflorescences** 15–60 (80) cm long, peduncle longitudinally ridged, spike 1.5–8 cm long, **bracts** 2.3–5 mm long, triangular. **Flowers** with sepals 2.4–3.5 mm long, the 2 anterior (abaxial) sepals almost completely united, posterior sepals ovate, corolla-lobes 1.8–2.8 mm long, thin, translucent, reflexed; anthers ca. 1.8 mm long; ovary with only 2 ovules. **Fruit** ca. 5 mm long, not covered by the persisting corolla-lobes; seeds 2.3–3 mm long, inner face concave.

*Plantago lanceolata* has been reported on the slopes of Volcán Irazú and Volcán Turrialba (Standley, Publ. Field Mus. Nat. Hist., Bot. Ser. 18: 1264, 1938), but we have seen no specimens from Costa Rica or elsewhere in Central America. The species is now cosmopolitan and is naturalized in many parts of the Andes; it can be a troublesome weed of lawns and grassland.

***Plantago major* L., Sp. pl. 112. 1753.**

**Herbs**, perennial from a short, thick rootstock, internodes tightly congested and hidden by the leaf-bases.

**Leaves** in basal rosettes, flat on the ground or erect, petioles 2–15 cm long, expanded at the base and clasping the stem; 10–30 (50) cm long 3–12 (18) cm broad, ovate to elliptic-ovate or broadly elliptic, obtuse at the apex, the larger laminae abruptly narrowed to the base and obtuse to truncate, margins entire or irregularly short-dentate, drying chartaceous, glabrous or with slender septate translucent hairs 0.3–1 mm long, venation palmate with 3–7 (11) primary veins. **Inflorescences** spicate, 15–35 (50) cm long, flowering portion 4–28 cm long and 6–8 mm thick (dry), peduncle puberulent in early stages but becoming glabrous, flowers closely congested distally, bracts 2–3 mm long. **Flowers** with sepals 1.2–2 mm long, broadly ovate to obovate, with thin margins, glabrous or minutely puberulent along the midvein abaxially, corolla-lobes 0.5–1 mm long, narrowly triangular, obtuse or acute, rotate, not persisting as a covering on the fruit. **Fruit** 2–3.8 mm long, ovoid, usually with 5–many brown seeds; seeds ca. 1 mm long and 0.6 mm thick, variable in shape but mostly oblong.

A cosmopolitan weed of open sunny sites such as recently cleared land, roadsides, and stream edges. It is naturalized in the Central Highlands between 500 and 1500 m elevation and appears to flower throughout the year in Costa Rica. The plants have been used medicinally, fresh or ground as poultices; they are known by the name *Llantén*. The broad leaves and very short corolla-lobes are distinctive.